

NPOESS System Architecture

Frederick L. Ricker

The National Polar-orbiting Operational Environmental Satellite System (NPOESS) architecture is built on a foundation of affordability, and three pillars of data quality, data latency, and availability. Affordability refers to an over-arching consciousness about cost to preserve the cost benefit to the government for implementing a converged system; some dimensions of cost include the cost for system development and implementation, the balance of system development cost and system Operations and Maintenance cost, and the fiscal year expenditure plan that meets schedule commitments. Data quality is characterized in terms of the attributes associated with Environmental Data Records, and the products that are delivered to the four US Operational Centrals. These EDRs are generated by the system using raw data from the space-borne sensors and spacecraft, in conjunction with science algorithms and calibration factors. Data latency refers to the time period between the detection of energy by a space-borne sensor to the delivery of a corresponding EDR. The system was designed to minimize data latency, and hence provide users with timely data. Availability refers to both data availability and system availability. Data availability is ensured by the way data is stored throughout the system, on the spacecraft and on the ground, so that it can be retrieved and resent if the first transmittal is not successful. System availability is a measure of how well around-the-clock operations are supported, through the careful deployment of hot spares and fault tolerance of the system. Both types of availability are very high for the NPOESS architecture. Overall, the NPOESS architecture successfully delivers to the government the benefits of affordability, high data quality, low data latency, and high data/system availability.